查询STB130NS04ZB供应商

STP130NS04ZB
STB130NS04ZB - STW130NS04ZB

N-CHANNEL CLAMPED - 7 mΩ - 80A TO-220/D²PAK/TO-247
FULLY PROTECTED MESH OVERLAY™ MOSFET

Table 1: General Features

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STP130NS04ZB	CLAMPED	< 9 mΩ	80 A
STB130NS04ZB	CLAMPED	< 9 mΩ	80 A
STW130NS04ZB	CLAMPED	< 9 mΩ	80 A

- TYPICAL R_{DS}(on) = 7 mΩ
- 100% AVALANCHE TESTED
- LOW CAPACITANCE AND GATE CHARGE
- 175°C MAXIMUM JUNCTION TEMPERATURE

DESCRIPTION

This fully clamped MOSFET is produced by using the latest advanced Company's Mesh Overlay process which is based on a novel strip layout. The inherent benefits of the new technology coupled with the extra clamping capabilities make this product particularly suitable for the harshest operation conditions such as those encountered in the automotive environment .Any other application requiring extra ruggedness is also recommended.

APPLICATIONS

- HIGH SWITCHING CURRENT
- LINEAR APPLICATIONS

Figure 1: Package

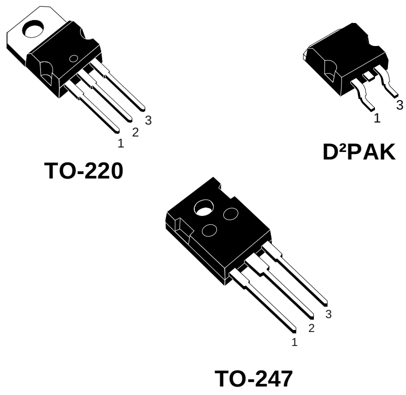


Figure 2: Internal Schematic Diagram

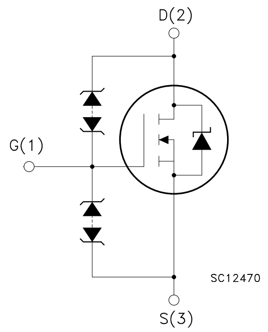


Table 2: Order Codes

Sales Type	Marking	Package	Packaging
STP130NS04ZB	P130NS04ZB	TO-220	TUBE
STB130NS04ZBT4	B130NS04ZB	D²PAK	TAPE & REEL
STW130NS04ZB	W130NS04ZB	TO-247	TUBE

Rev. 2

Table 3: Absolute Maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	CLAMPED	V
V_{DG}	Drain-gate Voltage	CLAMPED	V
V_{GS}	Gate- source Voltage	CLAMPED	V
I_D	Drain Current (continuous) at T_C = 25°C	80	A
I_D	Drain Current (continuous) at T_C = 100°C	60	A
I_{DG}	Drain Gate Current (continuous)	± 50	mA
I_{GS}	Gate Source Current (continuous)	± 50	mA
I_{DM} (•)	Drain Current (pulsed)	320	A
P_{TOT}	Total Dissipation at T_C = 25°C	300	W
	Derating Factor	2.0	W/°C
$V_{ESD(G-S)}$	Gate-Source ESD(HBM-C=100 pF, R=1.5 KΩ)	4	KV
T_j T_{stg}	Max Operating Junction Temperature Storage Temperature	-55 to 175	°C

(•) Pulse width limited by safe operating area

Table 4: Thermal Data

			TO-220	D²PAK	TO-247	Unit
Rthj-case	Thermal Resistance Junction-case	Max	0.50			°C/W
Rthj-pcb (*)	Thermal Resistance Junction-pcb	Max	--	35	--	°C/W
Rthj-a	Thermal Resistance Junction-ambient	Max	62.5	--	50	
T_l	Maximum Lead Temperature For Soldering Purpose (1.6 mm from case, for 10 sec)		300			°C

(*)When mounted on 1 inch² FR4 2oZ Cu

Table 5: Avalanche Characteristics

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max)	80	A
E_{AS}	Single Pulse Avalanche Energy (starting T_j = 25 °C, I_D = I_{AR}, V_{DD} = 30 V)	500	mJ

ELECTRICAL CHARACTERISTICS (T_{CASE} =25°C UNLESS OTHERWISE SPECIFIED)

Table 6: On/Off

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Clamped Voltage	I_D = 1 mA, V_{GS} = 0 -40 < Tj < 175 °C	33			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = 16 V,Tj = 25 °C V_{DS} = 16 V,Tj = 125 °C			10 100	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ±10 V,Tj = 25 °C			10	µA
V_{GSS}	Gate-Source Breakdown Voltage	I_{GS} = ±100 µA	18			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} = I_D = 1 mA	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V ,I_D = 40 A		7	9	mΩ

Table 7: Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs}	Forward Transconductance	V_{DS} = 15 V, I_D = 40 A		50		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25 V, f = 1MHz, V_{GS} = 0		2700 1275 285		pF pF pF
$t_{d(on)}$ t_f $t_{d(off)}$ t_f	Turn-on Delay Time Fall Time Turn-off Delay Time Fall Time	V_{DD} = 17.5 V, I_D = 40 A, R_G = 4.7 Ω, V_{GS} = 10 V (see Figure 15)		40 220 170 100		ns ns ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 20 V, I_D = 80 A, V_{GS} = 10 V (see Figure 17)		80 20 27	105	nC nC nC

Table 8: Source Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (2)	Source-drain Current Source-drain Current (pulsed)				80 320	A A
V_{SD} (1)	Forward On Voltage	I_{SD} = 80 A, V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 80 A, di/dt = 100A/µs V_{DD} = 25V, T_j = 150°C (see Figure 16)		90 0.18 4		ns µC A

(1) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(2) Pulse width limited by safe operating area.

Figure 3: Safe Operating Area

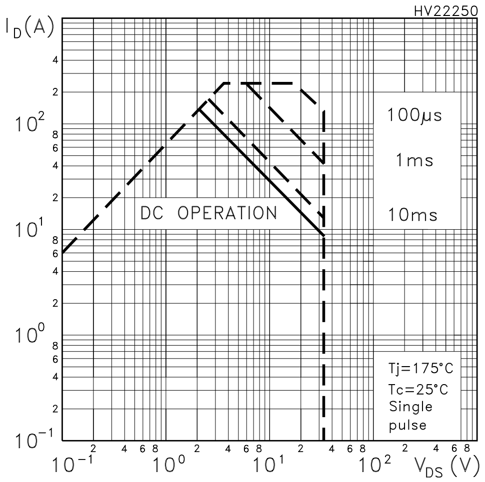


Figure 6: Thermal Impedance

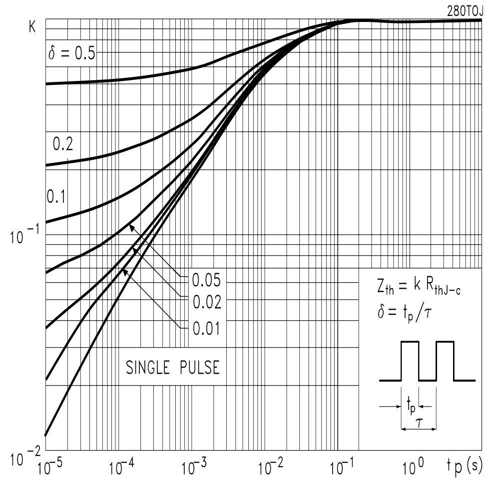


Figure 4: Output Characteristics

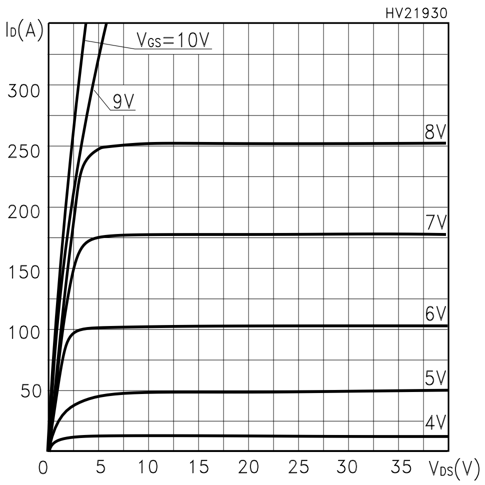


Figure 7: Transfer Characteristics

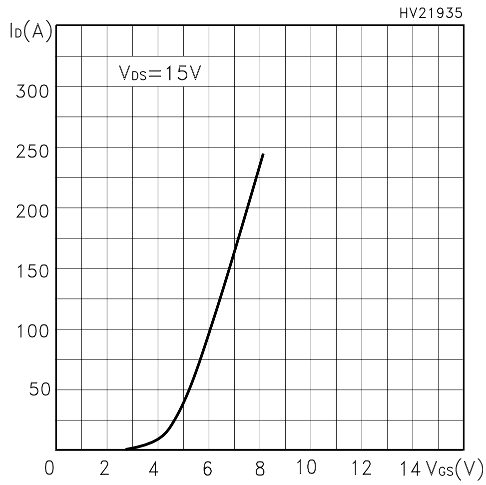


Figure 5: Transconductance

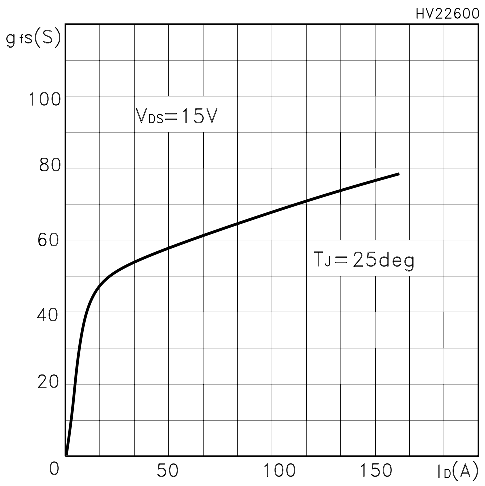


Figure 8: Static Drain-source On Resistance

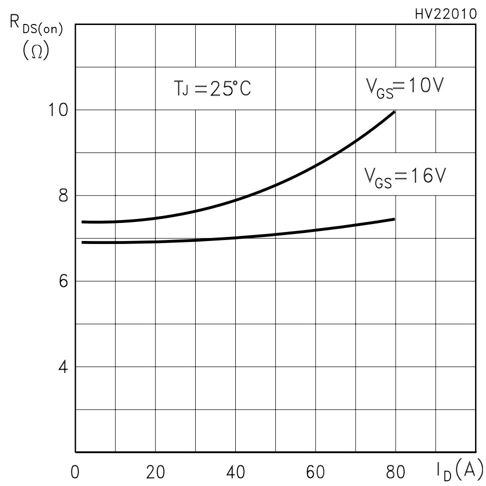


Figure 9: Gate Charge vs Gate-source Voltage

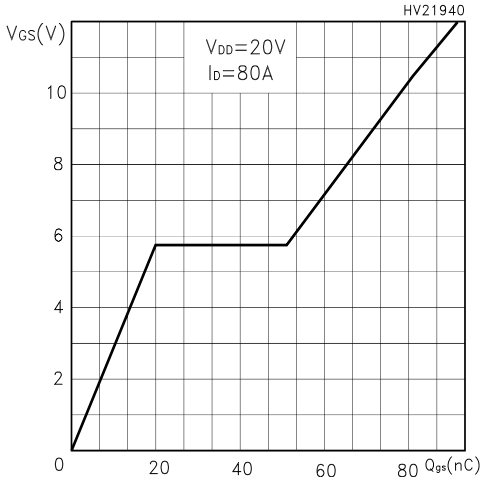


Figure 12: Normalized On Resistance vs Temperature

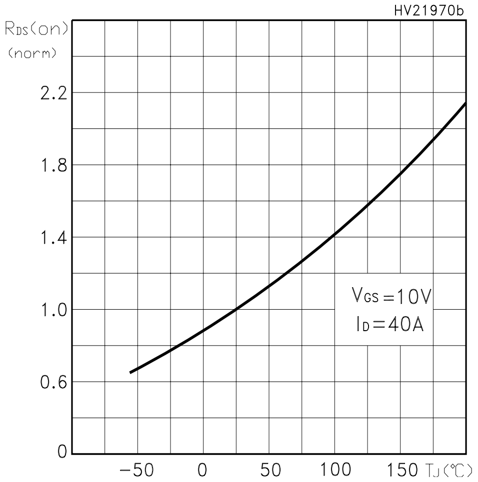


Figure 10: Normalized Gate Thereshold Voltage vs Temperature

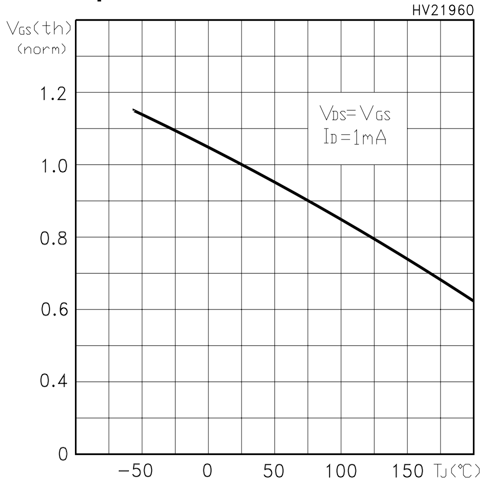


Figure 13: Source-drain Diode Forward Characteristics

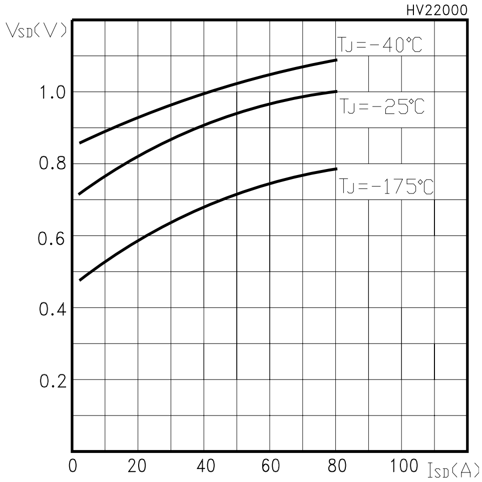


Figure 11: Capacitance Variations

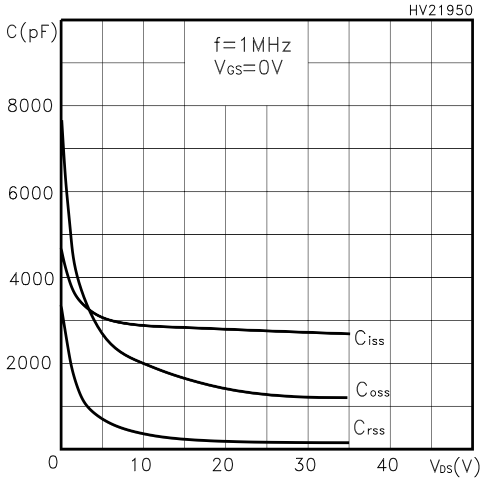


Figure 14: Normalized BVDSS vs Temperature

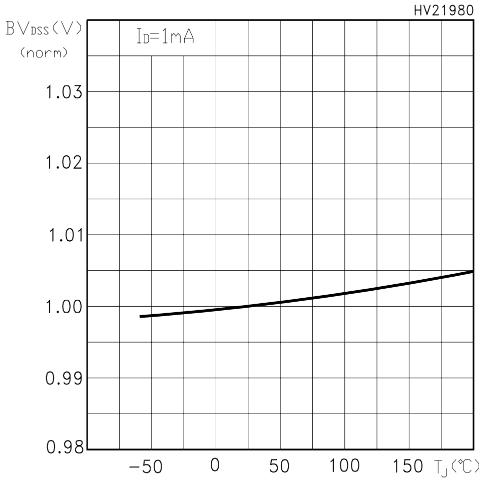


Figure 15: Switching Times Test Circuit For Resistive Load

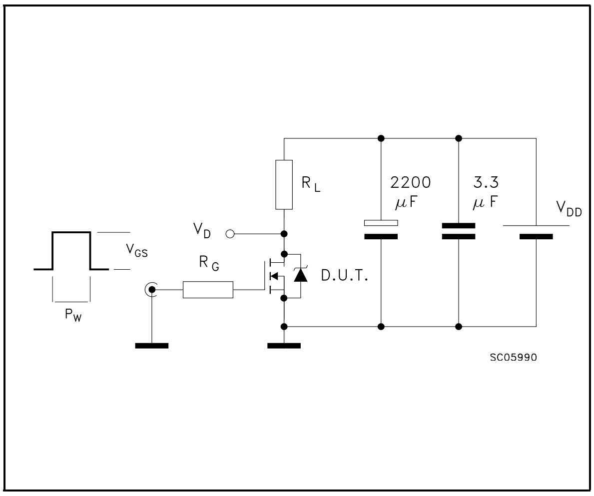


Figure 16: Test Circuit For Diode Recovery Behaviour

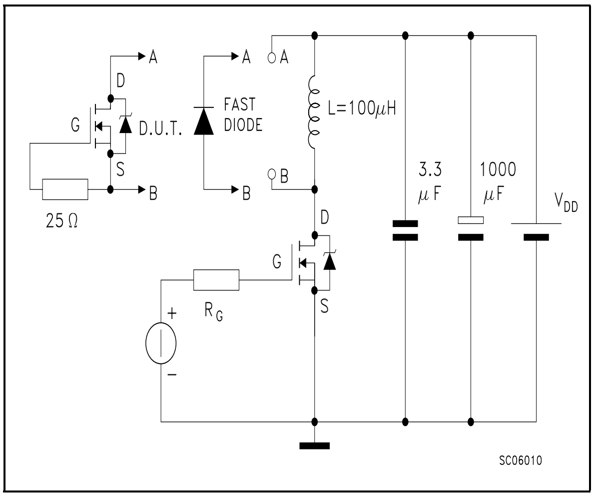
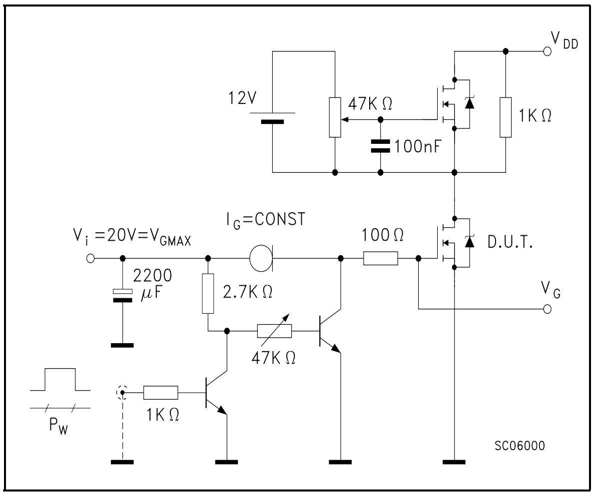
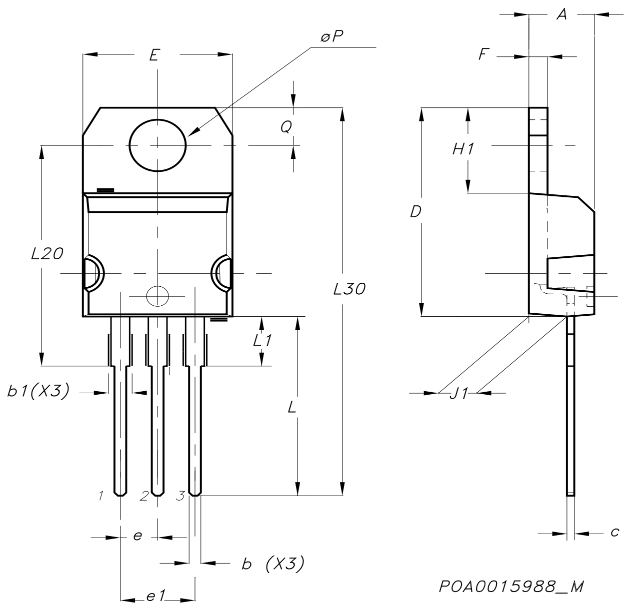


Figure 17: Gate Charge Test Circuit



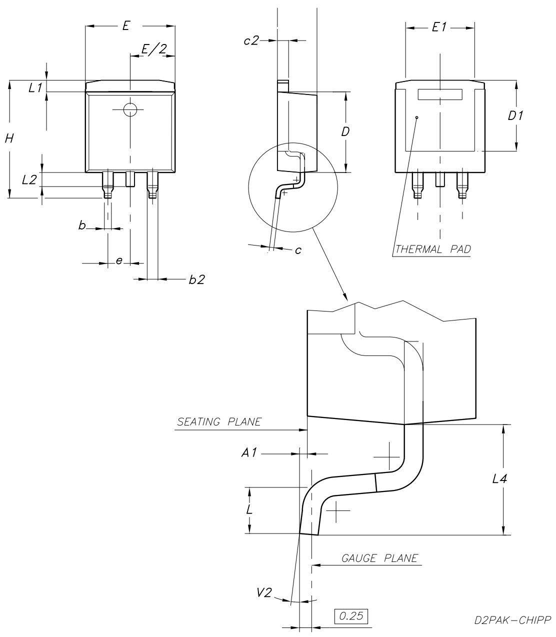
TO-220 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.60		0.620
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
øP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116



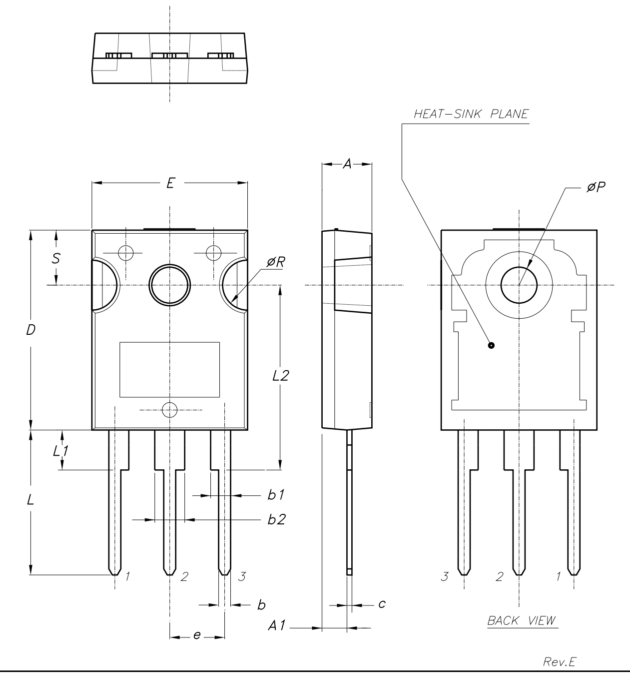
TO-263 (D^2PAK) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.32		4.57	0.178		0.180
A1	0.00		0.25	0.00		0.009
b	0.71		0.91	0.028		0.350
b2	1.15		1.40	0.045		0.055
c	0.46		0.61	0.018		0.024
c2	1.22		1.40	0.048		0.055
D	8.89	9.02	9.40	0.350	0.355	0.370
D1	8.01			0.315		
E	10.04		10.28	0.395		0.404
e		2.54			0.010	
H	13.10		13.70	0.515		0.540
L	1.30		1.70	0.051		0.067
L1	1.15		1.39	0.045		0.054
L2	1.27		1.77	0.050		0.069
L4	2.70		3.10	0.106		0.122
V2	0°		8°	0°		8°

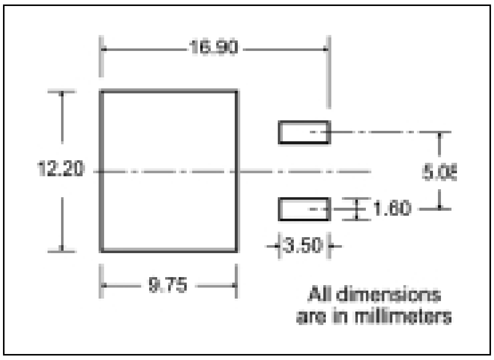


TO-247 MECHANICAL DATA

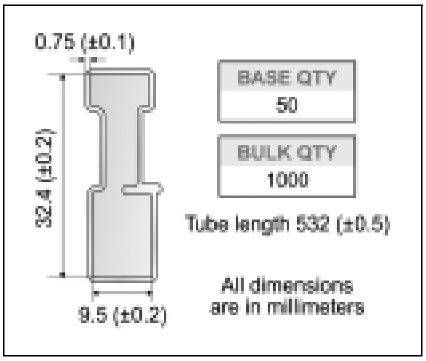
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.85		5.15	0.19		0.20
A1	2.20		2.60	0.086		0.102
b	1.0		1.40	0.039		0.055
b1	2.0		2.40	0.079		0.094
b2	3.0		3.40	0.118		0.134
c	0.40		0.80	0.015		0.03
D	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e		5.45			0.214	
L	14.20		14.80	0.560		0.582
L1	3.70		4.30	0.14		0.17
L2		18.50			0.728	
øP	3.55		3.65	0.140		0.143
øR	4.50		5.50	0.177		0.216
S		5.50			0.216	



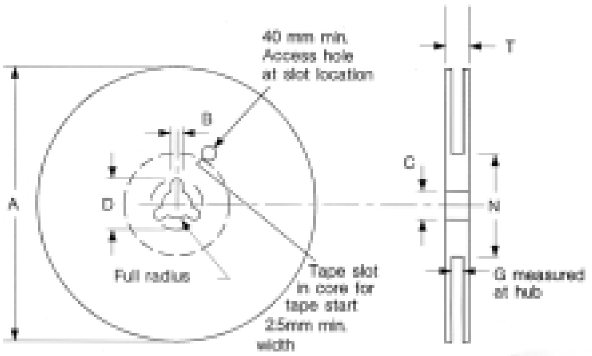
D^2PAK FOOTPRINT



TUBE SHIPMENT (no suffix)*



TAPE AND REEL SHIPMENT (suffix "T4")*



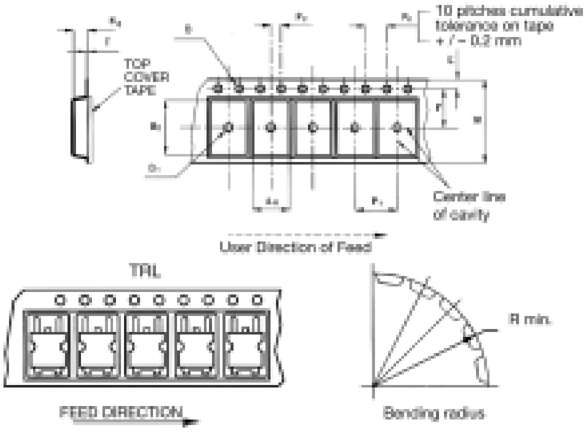
REEL MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0795	
G	24.4	26.4	0.960	1.039
N	100		3.937	
T		30.4		1.197

BASE QTY	BULK QTY
1000	1000

TAPE MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A0	10.5	10.7	0.413	0.421
B0	15.7	15.9	0.618	0.626
D	1.5	1.6	0.059	0.063
D1	1.59	1.61	0.062	0.063
E	1.65	1.85	0.065	0.073
F	11.4	11.6	0.449	0.456
K0	4.8	5.0	0.189	0.197
P0	3.9	4.1	0.153	0.161
P1	11.9	12.1	0.468	0.476
P2	1.9	2.1	0.075	0.082
R	50		1.574	
T	0.25	0.35	0.0098	0.0137
W	23.7	24.3	0.933	0.956



* on sales type

Table 9: Revision History

Date	Revision	Description of Changes
10-June-2004	1	First Release.
14-Jan-2005	2	Inserted D^2PAK, Complete version.

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